### Video 1: Dr. Quantum - Double slit experiment

**Before watching the video, answer the following questions:**

1. You are about to watch a video called "Dr. Quantum - Double slit experiment". What do you think it will be about?  
I don't have any idea. All I can guess is it will be about an experiment of something related to an application on mathematics .

2. Go to a dictionary and copy the definition of "slit". Is it a noun , a verb? Is it is both? Mention all definitions. **Please acknowledge the source.**

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| **Noun** | **1.** | slit**slit** - a long narrow opening  [jag](http://www.thefreedictionary.com/jag) - a slit in a garment that exposes material of a different color underneath; used in Renaissance clothing  [opening](http://www.thefreedictionary.com/opening) - a vacant or unobstructed space that is man-made; "they left a small opening for the cat at the bottom of the door"  [slot](http://www.thefreedictionary.com/slot) - a small slit (as for inserting a coin or depositing mail); "he put a quarter in the slot"  [vent](http://www.thefreedictionary.com/vent) - a slit in a garment (as in the back seam of a jacket) |
|  |  |  |
|  | **2.** | slit**slit** - a depression scratched or carved into a surface  [incision](http://www.thefreedictionary.com/incision), [prick](http://www.thefreedictionary.com/prick), [scratch](http://www.thefreedictionary.com/scratch), [dent](http://www.thefreedictionary.com/dent)  [imprint](http://www.thefreedictionary.com/imprint), [impression](http://www.thefreedictionary.com/impression), [depression](http://www.thefreedictionary.com/depression) - a concavity in a surface produced by pressing; "he left the impression of his fingers in the soft mud"  [scotch](http://www.thefreedictionary.com/scotch), [score](http://www.thefreedictionary.com/score) - a slight surface cut (especially a notch that is made to keep a tally) |
|  | **3.** | **slit** - a narrow fissure  [crack](http://www.thefreedictionary.com/crack), [scissure](http://www.thefreedictionary.com/scissure), [cleft](http://www.thefreedictionary.com/cleft), [crevice](http://www.thefreedictionary.com/crevice), [fissure](http://www.thefreedictionary.com/fissure) - a long narrow opening |
| **Verb** | **1.** | **slit** - make a clean cut through; "slit her throat"  [slice](http://www.thefreedictionary.com/slice)  [cut](http://www.thefreedictionary.com/cut) - separate with or as if with an instrument; "Cut the rope" |
|  | **2.** | **slit** - cut a slit into; "slit the throat of the victim"  [incise](http://www.thefreedictionary.com/incise) - make an incision into by carving or cutting |

Based on WordNet 3.0, Farlex clipart collection. © 2003-2008 Princeton University, Farlex Inc.

So, "slit" is either a verb or a noun. As a noun, it refers to a long fissure, an scratch. As a verb, it refers to the action of cutting or producing that scratch or fissure.  
Taken from (<http://www.thefreedictionary.com/slit>)  
  
3. Mention five words you think you will find in the video  
Knowing what slit means, I guess I will find words and phrases as "going through" or "passing through", fissures, particles, patterns, results.

**AnchorDuring and after watching the video, please answer**

Please click on the following link to watch the video and answer:  
<http://www.youtube.com/watch?v=DfPeprQ7oGc>

1. Are there any of the words you mentioned in the previous question in the video?  
Yes, I heard patterns, particles, "goes through"  
  
2. What's the experiment about? Describe it.

* a. What does he need to do the experiment?

He needed to understand how particles of matter act, and so do waves. In order to get it, he used a plane surface with a slit, other plane surface with two slits, a reflecting back blackboard, a marble cannon, a electron cannon and kind of a water pool where waves were studied.

* B .How many steps does it have?

We can consider six steps: **first**: shooting marbles (representing particles of matter) through a surface with one slit; **second:** shooting marbles through a surface with two slits; **third:** producing waves in front of a surface with one slit; **fourth:** producing waves in front of a surface with two slits; **fifth**: shooting electrons against a surface with one slit; **sixth:** shooting electrons against a surface with two slits. After each one of these steps, Dr. Quantum described the results printed on the back blackboard, finding coincidences and differences.

* c. What happens in each step?

In first step, marbles drew a bar, a line in the back board; in the second, they drew two bars as it was expected. In third step, waves drew a bar; in fourth, they drew many bars, “an interference pattern”. In sixth, electrons drew a bar in the back board; in seventh, they drew an interference pattern!

It turns out that particles of matter and waves described different patterns each case, and electrons behave totally different that it was expected, drawing the same patterns as waves instead of the pattern created by particles.

* d. What is the third element Dr. Quantum uses?

He used electrons instead of marbles in seventh and eighth step.

**3. What happens with balls and one slit? And with two slits?**

Shooting marbles through one-slit surface printed a bar, a straight line on the back board. Shooting them through two-slits surface printed two bars on the board.

**4. What about waves?**

Producing waves against one-slit surface printed a bar, a straight line on the back board. Producing them against two-slits surface printed several bars on the board, designing an interference pattern. **5. What happens with electrons?**

Shooting them randomly through one-slit surface printed a bar, a straight line on the back board. Shooting them against two-slits surface printed several bars on the board, designing an interference pattern.

So, he tried shooting one by one against those same surfaces, and one electron at time described the same two results in each case.

**6. What explanation does Dr. Quantum give?**

The only explanation he suggested was thinking about the electron leaving the cannon as a particle and becoming a wave of energy, going through both slits time and interfering with itself, designing the interference pattern, and hitting the board as a particle at the same time.

We have to think about the electron behaving as a particle and as a wave simultaneously .